AMBULANCE NOTES OF A BELLEVUE HOSPITAL INTERN: MAY 1938

MORTON GALDSTON, MD

ABSTRACT In 1938, as a New York University/Bellevue Hospital intern, I recorded notes on the 384 cases I saw during my 1-month ambulance duty. Although I intended to use them to follow up the clinical course of patients I admitted to Bellevue, the long hours and pressure of work made this ambitious goal unachievable. Sixty years later, after retirement from academic medicine and medical practice at New York University School of Medicine, I found the long-lost notes among my papers. They are of historic interest since they provide insight into aspects of primary and emergency medicine of the era when the therapeutic efficacy of the sulfanilamide class of agents was under investigation, a unique view of the life of an intern just before interns were replaced on ambulances by technicians, and a glimpse of the surprising character of several neighborhoods of pre–World War II Manhattan. The notes also provide the basis for a current analysis of case incidence and treatment by disease category. A description of the confluence of social, economic, and political forces that led to the establishment of the Bellevue Hospital Ambulance Service, the first such urban service in the world, is included.

KEY WORDS Ambulance, Bellevue Hospital, Intern, Intern Life.

INTRODUCTION

I rode ambulance for the month of May 1938, toward the end of my first year of internship at the New York University (Third) Medical Division of Bellevue Hospital. This was 69 years after the world's first urban ambulance service was inaugurated at Bellevue Hospital and 202 years after the hospital itself was founded.[1]

Why was an urban ambulance service so late in coming, and what was the confluence of economic, social, and public health factors that led to its establishment? Until the post–Civil War era, there was little faith in doctors, many of whom were trained poorly or not at all. Most people attempted to meet their

Dr. Galdston is Clinical Associate Professor of Medicine, New York University School of Medicine. Correspondence to: 3 Robbins Lane, Great Neck, NY 11020–1210.

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medical needs on their own, primarily using home remedies.[2] They feared and avoided hospitalization. Indeed, the mortality rate of hospital-treated illnesses far exceeded that of illnesses treated at home. There was, therefore, a lack of public concern about how patients in urgent need of care reached hospitals. When hospitalization was unavoidable, people resorted to whatever means of transportation were available: walking, horse and buggy, litters, even delivery wagons.[3]

Starting in the early 1830s and accelerating markedly after the Civil War, industrial expansion in New York City led to a dramatic increase in population as thousands moved from rural areas and foreign countries to a rapidly expanding labor market. To meet the exploding need for cheap housing near factories, tenements were constructed hastily, providing cramped, poorly ventilated, ill-lit quarters with inadequate sanitary facilities. They quickly became slums.[4]

As urbanization increased, so did sanitation problems, overwhelming the ability of the politicized and poorly administered Health Department to control garbage collection and the removal of vast amounts of manure created by the increase in horse-drawn carriages. Mounting public concern about public health led to the organization of the Citizens Association in 1861, a group dedicated to the reform of city government. The association's exposure of the miserable sanitary conditions in the city, and fear caused by an ongoing cholera epidemic, contributed to the formation in 1866 of the stable and independent Metropolitan Board of Health. Soon after, the board appointed Dr. Edward B. Dalton as Sanitary Superintendent of the metropolitan area in charge of administration.[5]

HISTORY OF THE FIRST URBAN AMBULANCE SERVICE

Dr. Dalton, who had completed his internship on the Columbia University Medical Division of Bellevue Hospital in 1859 and had subsequently become a member of the Bellevue staff, served in the Union army during the Civil War. There, he organized and directed a highly efficient ambulance service to transport thousands of wounded and sick army personnel to the Depot Field Hospital of the Army of the Potomac. Despite daunting conditions, the service helped save countless lives.[1(pp66–68)]

In May 1869, the board's Commissioners of Public Charities and Correction, which later supervised the ambulance service, asked Dr. Dalton to submit a plan for an ambulance corps at Bellevue Hospital. Attitudes toward hospital care had changed by this time. In 1868, the Citizens Association reported that Bellevue Hospital had reversed its long-standing negative status and gradually was gaining the confidence of those it served.[5(p180)] Drawing on his extensive military

ambulance experience, Dr. Dalton developed a plan that the commissioners promptly approved.[1(p69)]

The ambulance system was inaugurated at Bellevue Hospital in June 1869, eight years before other urban ambulance services in the US. The commissioners ordered that two ambulances be built according to Dr. Dalton's specifications and be kept "in good order and fit for service at all times." Among the rules governing ambulances, the commissioners specified that each should have

> beneath the driver's seat "a box . . . containing a quart flask of brandy, two tourniquets, a half-dozen bandages, a half-dozen small sponges, some splint material, pieces of old blankets for padding, strips of various lengths with buckles, and a two-ounce vial of persulphate of iron" (an astringent used to stop bleeding).[1(p69)]

Once ambulance services were established at other hospitals in New York City (New York and Roosevelt, 1877; St. Vincent's, 1879; and Presbyterian, 1880), each assumed responsibility for a specific geographic area and kept to its district except in a major emergency.[1(p70)] Patients were taken to the hospital or their homes based on the severity of their injury or illness.[6]

In 1879, the New York State legislature passed an act giving the right of way to "every ambulance . . . used for the transportation of sick and wounded persons" over all other vehicles except those of fire apparatus and the US Mail Service.[6] Ambulance speed of travel was restricted to 3.5 to 6 miles an hour in business districts and 5 to 8 miles an hour in less congested areas. Ambulance drivers, who had to pass an examination covering the geography of the city and the shortest distances between points, were paid $500 annually in addition to board and lodging.[1(p71)]

By 1893, ambulances also carried "a stretcher . . . and handcuffs and straitjacket for insane patients or patients of demonstrative disposition." A movable floor that could be pulled out to receive patients, and permitted disinfection when necessary, had also been added.[1(p71)] Ambulance designers took great pains to distinguish these vehicles from delivery wagons, Black Marias (which carried patients with contagious diseases), and hearses.[6] The first motorized ambulance service was introduced in Chicago in 1899, and the first in the New York area apparently was initiated at St. Vincent's Hospital in Manhattan in 1900.[7] Bellevue's ambulance service was motorized completely by 1924, when the last of the ambulance horses were let out to pasture.[8]

How Ambulance Calls Were Received and Dispatched Originally

In the first years of ambulance service, calls for an ambulance were transmitted via telegraph and, later, by telephone wires either by police officers, from the site of the emergency to the police department, or by anyone using fire department

signal boxes. In the last case, a code based on the number of bells was used to distinguish ambulance calls from fire calls. Whatever their source, ambulance calls then were transmitted to the designated hospital.[1(p72)]

Ambulance Staffing

From the very beginning, two surgeons rode in the ambulance. They had to pass an examination to prove their ability to diagnose and treat medical and surgical emergencies. Initially, the ambulance surgeons devoted full time to ambulance duty. Like ambulance drivers, they were paid $500 annually plus room and board. Later, the salary was exchanged for positions as in-hospital junior surgical assistants, but they were not in line for promotion.[1(p71)]

The surgeon's bag contained items necessary for emergencies: antiseptic fluids, gauze, and the like. Surgeons maintained a log of the time of call, of departure, of arrival at the scene, of return, and of any details that "a coroner's jury might possibly require."[6]

Late in the 1890s, ambulance service was integrated into the training programs of interns at Bellevue Hospital; this continued until 1941. Then, in anticipation of large numbers of house staff members being called for military service during World War II, the Department of Hospitals arranged for ambulance attendants, trained in first aid according to American Red Cross guidelines, to ride in the ambulance instead of interns. In the event of a major accident, a squad of the emergency field unit would respond with the necessary physicians and nurses. In maternity cases, a physician or nurse would accompany the ambulance.[9]

NOTEBOOKS OF AN AMBULANCE INTERN

In May 1938, after nearly a year of internship, I was assigned to 1 month of ambulance duty. I attended 384 patients during that month and recorded in two hard-cover, pocket-size notebooks (issued at the beginning of our internships by the hospital to help each intern keep a record of his or her daily assignments on rounds with the senior intern and chief ward nurse) a brief note about each patient. This included name; age (in most instances); gender; the address of the call and the patient's home address; diagnosis; treatment administered, if any; and disposition. I kept this diary with the intent of learning the accuracy of my diagnoses and the subsequent clinical course of the patients I had admitted to Bellevue. I hoped to visit them and review their hospital charts at bedside or, following discharge, in the record room. However, the long hours and pressure of work made this ambitious goal unachievable.

As I pursued my career, I lost track of the notebooks. On retiring 53 years later, I found them while going through my papers. Rereading the entries reminded me

of the enormous changes in medicine since I rode in the ambulance 61 years ago, "when medical knowledge was almost primitive compared to what it is today . . . "[10] I thought that recounting my experiences would provide a perspective on that period in history.

Life of a Bellevue Intern on Ambulance Duty

In 1938, before going on ambulance duty, interns would have had some surgical and medical ward duty, supervised by second-year interns, residents, and attending physicians. I had had 6 months of medical duty and 3 months of surgical ward duty. We worked 12-hour ambulance shifts, from 8 AM to 8 PM or 8 PM to 8 AM, as we had as interns in the hospital. I worked the day shift for the first 3 weeks and the night shift for the last 8 days. My only time off duty was the last weekend prior to going on night duty. After each call, we completed an ambulance report form.

I looked forward to ambulance duty with considerable excitement, as well as some trepidation. For the first time in my hospital training, I alone would be responsible for making what might be critical health-related decisions. It was to be a challenging opportunity to respond to urgent calls, not knowing the problems I would face from call to call and, above all, having to evaluate a situation quickly, come to a rational diagnosis, and decide the best course of action for each patient. My options were to treat patients locally, transport them to Bellevue Hospital, arrange for their admission to the Willard Parker Hospital for Contagious Diseases, or refer them to a Bellevue clinic.

Interns were provided room, board, and uniforms: a white jacket and trousers for the men and skirts for the few female house staff members. White shirts or blouses were worn with these, as was a stiff blue ambulance cap similar to that of a train conductor today. Our uniforms were picked up weekly for laundering and returned to our rooms by the hospital maid service. It was our responsibility, however, to keep our shoes polished so they were as white as our stiffly starched uniforms.

We were paid a salary of $15 every 2 weeks, called, ironically, "cigarette money." This salary was first awarded in 1936 by the aldermen of New York City, with the support of Mayor Fiorello LaGuardia, over the objections of Dr. S. S. Goldwater, Commissioner of Hospitals. Dr. Goldwater maintained that internship was part of a physician's education, and that interns should not receive a salary, but should be thankful they were not being charged tuition.[11]

We ate in the house staff dining room, which had a stark appearance: no decorations on the walls, a tile floor, and round tables covered with white linen

tablecloths each set with two 2-quart aluminum pitchers, one filled with water, the other with milk. Each table sat about 12 persons, for a total seating capacity of about 200.

Once a week, each staff member was issued a clean linen napkin, which was kept in an assigned place in a wooden stand positioned in one comer of the room near the entrance. Food was served by young women in white aprons and hairnets.

Close by the entrance to the dining room, one often was met by Dr. Jacobs, the hospital superintendent. He stationed himself there apparently not to greet us, but to enforce his own rule about not smoking in the dining room. "Doctor, put it out!" is the phrase I recall.

The dining room served as a place where staff members informally discussed interesting cases with each other, arranged for social activities, or just relaxed for a while. One could even have the neighborhood tailor come there to pick up and deliver garments in need of tailoring, cleaning, and pressing.

Occasionally, horseplay took place when food service was delayed for longer periods of time than some hungry and impatient individuals liked. They would set up raucous, almost deafening, sounds by spinning empty plates on the tile floor and banging on the aluminum pitchers with their eating utensils. Once started, nearly everyone joined in.

On returning to the hospital from a late night call, the efficient and often motherly nurses in the admitting room generally would offer us a light snack of toast and jam and milk, tea, or coffee prepared from the hospital supply. We could rest, fully dressed, between calls in a room adjacent to the ambulance call-receiving office. A ward attendant would come to the door to tell us when the next call had arrived. We would pull ourselves together hurriedly to meet the waiting ambulance in the nearby courtyard.

A major concern an intern on ambulance duty had was not to return to the hospital with a patient who was dead on arrival (DOA). This would be a great embarrassment, and word was bound to spread among one's peers. The penalty was to treat one's fellow ambulance interns to a round of beer.

Role of the Police

A police officer was supposed to meet the ambulance at the site of each call to protect the ambulance staff from violent patients and, if necessary, help the driver carry the patient to the ambulance. We were instructed not to enter a building without a police officer. Occasionally, however, when the police were late in

arriving, my driver would advise me to go ahead with the call, saying he knew the building was safe.

Ambulance Drivers

Ambulance drivers became city civil service employees in 1936. They still were required to pass tests of their driving competence and knowledge of the geography of the assigned cachement area, but their workdays were now reduced from 12 hours to 8. (Interns, however, continued to work 12-hour shifts both in the hospital and on ambulance duty.)

I found the drivers congenial, dedicated, helpful men who drove carefully and, when necessary, daringly, at a relatively fast speed. (In 1936, ambulances were given all possible rights of way.)[12] The drivers knew shortcuts and traffic conditions at various times of the day and night. They generally had a good sense of humor. I remember returning from a street call to a psychiatrically disturbed patient very early one morning when the moon was full and bright. The driver asked jokingly, "Doc, do you know that a full moon really *does* bring out the psychos?"

Some drivers were well aware of repeat calls from the same address. Once, on arriving at a call on a Saturday night, the driver advised me, "Doc, I know my customers. You don't have to carry your bag all the way up those five flights. It's that crazy drunken couple going at each other again. All you need is tape, gauze, and mercurochrome." I could carry these supplies easily in the lower two pockets of my loose-fitting jacket.

The driver did indeed know his customers. When I arrived at the fifth floor walk-up apartment, I found a young couple, both drunk, shouting as they traded punches. The husband was winning the battle when the accompanying police officer, whom I called on, interceded. The wife had several small, nonbleeding lacerations of the forehead and some contusions of the face and lips. I went down to the ambulance for a liquid sedative, a mixture of sodium bromide and chloral hydrate commonly used at that time. I made certain each swallowed a dose and urged them to go to sleep.

The ambulance driver clanged his bell as he drove (screeching sirens had not yet come into use) to forewarn pedestrians and other drivers to stay clear. The intern sat on a wooden bench in the rear of the ambulance, holding on to a leather strap suspended from the side wall. It was necessary to hold on particularly tightly when the ambulance turned corners. This seating arrangement could become less than comfortable. Toward the end of my ambulance service, as a result of

hours of sitting and bouncing on a hard surface in a moving vehicle, I developed an irritated buttock. Fortunately, this occupational disorder responded to hot sitz baths.

Supplies and Equipment

Supplies, limited to medications for immediate use in emergencies, were packed neatly in the doctor's black bag, which, fully equipped, weighed about 10 pounds. They included a thermometer, gauze pads, bandages of various sizes, adhesive tape, mercurochrome, obstetrical supplies, and sterile glass syringes and hypodermic needles, both of which, after use, could be resterilized in the hospital. Disposable plastic syringes and needles were yet to be developed. Equipment included clamps, forceps, sutures, surgical needles, tourniquets, a fracture board, a variety of splints, and a stretcher.

Receiving and Dispatching Calls in 1938

The ambulance service was under the supervision of the Department of Hospitals. However, all calls for an ambulance were received by telephone at police headquarters and then routed via telephone to the hospital responsible for calls in the area in which the call had originated. Two-way radios were unavailable at that time; therefore, the ambulance had to return to the hospital after each call to be ready to respond to the next call.

Hospitals were assigned to respond to calls within specific geographic boundaries. Bellevue's territory was bounded on the north by 47th Street, on the south by Houston Street, on the east by the river, and on the west by Broadway from 25th to 38th Streets and by Fifth Avenue from 38th to 47th Streets and below 25th Street (where the avenue crosses Broadway) to Houston Street. In unusual emergencies, or on police request, ambulance crews went out of their assigned areas.[13]

Bellevue Hospital's cachement area was one of sharp contrasts: from Second and Third Avenues, blighted by the darkness, noise and dirt of the elevated trains to the elegance of Fifth Avenue; from countless "hole-in-the-wall" stores to world-renowned enterprises; from the flophouses and homeless shelters of the Bowery to the luxurious penthouses of Park Avenue. It included the exclusive Gramercy Park residential neighborhood, as well as the slums of what had been the malodorous Gashouse District (later replaced by the Peter Cooper and Peter Stuyvesant housing complexes); the Kips Bay tenements, on which site Kips Bay Plaza apartment buildings were built; and the Abattoir District, with its stench of slaughtered poultry and cattle (later the site of the United Nations headquarters). The population ranged from the poorest to the wealthiest, from recent

TABLE Distribution of Cases Among Categories of Diseases, 1938

Rank	Disease Category	Number of Cases	% Total
1	Mental disorders	79	21
2	Injury	69	18
3	Respiratory system	61	16
4	Infectious and parasitic	46	12
5	Symptoms, signs, and ill-defined conditions	29	7
6	Circulatory system	26	7
7	Digestive system	21	6
8	Musculoskeletal system and connective tissue	20	5
9	Nervous system and sense organs	9	2
10	Genitourinary system	8	2
11	Pregnancy and abortion	6	2
12	Neoplasms	4	1
13	Skin and subcutaneous tissue	3	.8
14	Endocrine, nutritional and metabolic diseases, and immunity disorders	2	.25
15	Poisoning	1	.25
	Total	384	100

immigrants barely able to speak English to families who had lived there for generations, and from those struggling to be in the mainstream to leaders in many fields of endeavor.

CATEGORIES OF DISEASES AND RELATED CASES

In the discussion that follows and in the accompanying Table, I have arranged the cases that I saw according to categories of diseases in the International Classification of Diseases (ICD),* with one exception: the category "Pregnancy and Abortion" replaces item 11 ("Complications of Pregnancy, Childbirth, and the Puerperium"). In some instances, a case had two and, occasionally, three diagnoses. The primary diagnosis was the criterion for assigning a case to a particular category. Secondary and tertiary diagnoses were referred to if they were relevant to the presentation.

The Table lists the categories in decreasing number of cases per category and the corresponding percentage of the total number of cases seen. Individual case histories are presented for a variety of reasons: to illustrate the therapeutic benefit derived from the application of simple physiologic principles, differences in emotional reaction to injury, the role household environment may play in re-

*Fifth edition, vol. 1. Salt Lake City, UT: Medicode; 1996:114–122.

sponse to illness, some common reasons for ambulance calls in 1938 that no longer prevail, and human interest.

Alcoholism

Alcoholism was the most common cause for ambulance calls and subsequent hospital admission. I saw 41 alcoholics, 39 men and 2 women, in different degrees of inebriation. Their ages ranged from 16 to 70 years. They appeared to vary in social and economic background, from derelict to white-collar worker.

The guidelines of the police department under Mayor LaGuardia were to try to keep alcoholics off the streets and to bring them to the Bellevue Psychiatric Building. This served to protect the alcoholics from assault by other alcoholics and also helped maintain a better public image of the city. The police generally called for an ambulance from the site where the alcoholics had been found, but sometimes first transported them by patrol car to a nearby police station where the interns could examine them.

Of the 41 alcoholics, 28 were free of external evidence of injury other than contusions, abrasions, and minor lacerations. Thirteen were presumed to have fractures, 11 of the skull, 1 of the nose, and 1 of a tibia. Of those with a presumed skull fracture, most were found lying in the street. They had lacerations of the face and scalp, some with hematomas, probably from a "head-first" fall. Only one required suture of the scalp. The policy of the Surgery Department was to suture only profusely bleeding scalp injuries to minimize the risk of infection. The tibial fracture occurred in an intoxicated woman who fell off a chair.

Alcoholics were admitted to either a medical or surgical ward in the Psychiatric Building. All psychiatric patients were under the supervision of the New York University division. An intern and, independently, a senior house officer recorded the patient's history (if unobtainable on admission, this was deferred until the patient was sober), conducted a physical examination, and made a diagnosis. A blood count, blood chemical and urine tests, a test for syphilis, a chest X-ray, and an electrocardiogram were performed routinely. The findings were reviewed by an attending physician, and a plan for treatment was devised.

Many patients were deficient nutritionally, with such signs of vitamin deficiency as peripheral neuritis, beriberi heart disease, pellagra, and scurvy. On admission, they were fed a well-balanced diet with appropriate vitamin supplements.

Following "drying out," those who had troublesome bleeding hemorrhoids or an inguinal hernia, but who were otherwise physically fit, were offered surgical correction. Some granted written permission for such procedures. The operations

generally were relegated to junior surgical interns under the supervision of a member of the surgical attending staff. It was agreed tacitly that those who underwent such surgery would have an extended in-hospital recovery period, based on the judgment of the senior house staff member and attending physician.

Some patients deemed healthy enough agreed to donate blood to the hospital blood bank. They thus helped our medical division maintain a high rank in the listing of blood bank donations for each of the four divisions. This listing was posted on a bulletin board near the entrance to the house staff dining room. In further friendly rivalry, a similar competitive listing of the monthly percentages of permission for postmortem examinations was also posted.

Representatives of Alcoholics Anonymous frequently visited the patients to encourage them to join the movement. At times, they met with success.

A case related to alcoholism: a man who fell into the East River Early one evening, a call for an ambulance came from the boat dock at 25th Street and the East River near Bellevue. There I found a 44-year-old inebriated man. He had visited his sister, a patient on the ground floor of the Medical Building, which faces the river. He weaved and stumbled eastward onto the dock, lost his balance, and fell into the less-than-pristine waters. Fortunately, he had grasped one of the dock supports, and someone had seen him fall, heard his screams, and called for an ambulance. The police arrived promptly and threw a heavy rope to the man, exhorting him to grab it and hold on with both hands, which he was barely able to do. He was then literally "fished out" of the water. With the help of the ambulance driver, I wrapped him—drenched, shivering, and reeking of alcohol—in a blanket and quickly had him transported to the Bellevue Hospital Psychiatric Building, a short distance away.

DRUG DEPENDENCE

Drug dependence related to heart disease I saw six drug addicts: five men and one woman, with three of the men in jail. Three were addicted to morphine, one to both morphine and alcohol, and two to heroin. All needed a "fix." Two of the morphine addicts said that they had a history of episodes of severe chest pain, presumably due to heart disease. The pain was relieved most effectively by injections of morphine in the form of Magendie's Solution, initially administered by their physicians. One of the heroin addicts ascribed his addiction to injections, administered by "a friend," for relief of pleuritic chest pain from tuberculosis.

These are examples of so-called medical addicts, a term used to describe a patient in treatment for a medical disorder who becomes "addicted" to the available prescribed drugs, which the patient begins taking in excessive doses,

out of control. I treated all six with subcutaneous injections of the Magendie's Solution.

A note on Magendie's Solution Magendie's Solution is named for Francois Magendie, MD, a famous French physician (1783–1855) who stressed the therapeutic potential of newly discovered alkaloids such as morphine, codeine, and cocaine, and published a pocketbook formulary for physicians.

To my surprise and chagrin, neither I nor those of my Bellevue contemporaries whom I consulted when I was preparing this manuscript recalled that the intern's black ambulance bag contained this preparation of morphine. Through the kind and diligent efforts of the late Rita L. LaCouture, RN, a graduate of the Bellevue Hospital School of Nursing and a member of the Bellevue Infection Control Staff, it was found listed in Dreyfus, WE, "The Hospital Formulary of the Department of Public Charities and the Department of Bellevue and Allied Hospitals of the City of New York of 1931." An accompanying note reads, "Instructions for the Preparation of Magendie's Solution of Morphine: The rules of this Department require this solution to be dispensed in *blue* poison bottles and to be kept inaccessible to unauthorized persons."

Psychiatric Disorders and Representative Cases

The following disorders were diagnosed among the 32 psychiatric patients I attended: hysteria, psychoneurosis, reactive depression, anxiety state, agitated confusion, suicidal tendency, schizophrenia, and unspecified psychosis. I saw proportionately more psychiatric patients (13) during my 10 days on night duty than on my 19 days on day duty (19).

Case of an agitated woman A 27-year-old agitated woman was examined in the street at 3:30 AM. She said she had arrived from Boston that afternoon looking for her mother and sister, whom she had last seen 10 years ago. She related that she had an 8-year-old child, and that her husband, Sam, had seven children with another woman. When asked to name the president, she said: "It is either Tom or Harry Roosevelt." (Franklin Roosevelt was then president.)

Case of attempted suicide An acutely inebriated 32-year-old man was holding his child in his arms, threatening to kill the child and himself by jumping out of a third-floor window. Most such patients were taken by ambulance and admitted to the Bellevue Psychiatric Service. In most cases, I was able to calm the patient, but when necessary, the police officer on ambulance duty restrained the individuals and placed them in the ambulance.

A suicide and an overzealous reporter Tony was a reporter for one of the city's tabloid newspapers, assigned to cover goings-on at Bellevue. He had a small office on the ground floor of the hospital administration building. In his 30s, tall, and outwardly affable, he nevertheless was considered inordinately aggressive. He had the reputation of knowing what was going on in every quarter of the hospital, information gained through his "personal channels" regarding which person of notoriety had been admitted, for what reason, to which ward (especially if it was to the emergency ward), or had been discharged or died. If the last, he knew whether the case had been assigned to the Medical Examiner's Office and what diagnosis had appeared on the death certificate.

I had responded to an early afternoon call at a Park Avenue penthouse and found a sad sight: on the bedroom floor was the body of a beautiful woman, about 35 years old, who had committed suicide about an hour earlier by inhaling household gas. A neighbor, smelling gas coming from the apartment, had knocked frantically on the door, with no response. She then had quickly alerted the superintendent of the building, who entered the apartment, opened all the windows, and called for an ambulance.

I was kneeling on the floor, examining the body when, almost immediately, Tony came racing into the room, holding a camera in one hand and shouting, "Doc, move around so I can get your face as you're working on her." I was enraged at his brashness and called out angrily, while tapping my derriere, "Tony, this is what you can take; now get the . . . out of here!"

At this moment, the police officer assigned to the ambulance call arrived. He had heard my exclamation and, amidst Tony's protests that he needed the picture for that evening's headlines, escorted him out. I learned from the newspaper story, minus a photograph, that the suicide victim had become seriously depressed after her husband, a well-known Wall Street magnate, divorced her to marry a recent beauty contest winner.

Hyperventilation Tetany in an Anxious Young Woman

One afternoon during my first week of ambulance duty, I responded to an ambulance call from the New York University Dental School, which was close to Bellevue Hospital. Two faculty members met me in the hallway leading to the outpatient clinic. The senior of the two said they had a hysterical young woman patient whom they wanted me to have admitted to Bellevue Hospital. He reported that, while waiting for a local anesthetic, novocaine, to take effect in preparation for a dental procedure, she had begun to behave peculiarly. Her breathing had become erratic, and she had developed frequent muscle twitches.

The dentists had tried to persuade her to calm down by reassuring her that the anesthetic would soon wear off, and she would have no lasting ill effects. They applied a cold compress to her forehead and gave her whiffs of nitrous oxide gas (an anesthetic commonly used in dentistry), all to no avail.

On entering the clinic waiting room, I found the young woman lying on a wooden bench. After observing her carefully, it became apparent that she was going through cyclic breathing episodes of gradually increasing depth, followed by a period of cessation of breathing associated with tightly clenched jaws and spastic contractions of her hands and feet. I recognized that this was typical of the hyperventilation syndrome in which excessive breathing (i.e., beyond the requirements of body metabolism) can lead to (1) marked depletion of blood carbon dioxide concentration, essential for maintenance of a normal breathing pattern; and (2) depletion of functionally available blood calcium concentration, resulting in hyperirritability of skeletal muscles.

To their puzzlement, I asked the onlooking dentists for a paper bag, which they handed me after a search of a few minutes. I adjusted it to the patient's face and had her breathe in and out of it. Normally, the concentration of carbon dioxide in the air we inhale is low, but that in air we exhale is much greater. By rebreathing air exhaled into the bag, the abnormally low blood carbon dioxide concentration is restored gradually toward normal, thus breaking the "vicious" breathing pattern and restoring normal blood calcium concentration, thereby relieving muscle irritability.

Within a short period of rebreathing, the patient's breathing pattern returned to normal, as I had anticipated. Although she complained of a headache and sore muscles, she sat up, requested a drink of water, regained her composure, and asked to see her fiancé, who was waiting in an adjacent room. She explained that she had been anxious in anticipation of the dental work she was to undergo. Unfortunately, she had been unaware of the need for a local anesthetic by injection prior to her dental treatment. Furthermore, hypodermic needles had made her nervous ever since she underwent a tonsillectomy in childhood.

She said she felt "good enough" to leave with her fiancé. However, the dentists insisted that I have her admitted to the hospital for "her own safety." After much discussion, she walked out of the building to the ambulance, accompanied by her fiancé. As I learned later from the admitting physician, on arriving at the Bellevue Hospital Admitting Office, she refused admission and signed a form releasing the hospital from any responsibility if an illness developed as a result of her refusal to be admitted.

Word of the episode spread throughout the dental school, with focus on my

odd method of treatment. The next day, at the request of the faculty members who had treated the patient, a dental student came to see me to learn the rationale for the "paper bag treatment." On leaving, he said they suspected that I actually had hypnotized the patient with my blue eyes!

Injuries and Their Causes in Nonalcoholics

Among the 69 injuries I saw in nonalcoholics, falls caused the greatest number by far (32). Falls at home exceeded falls out of the home (19 vs. 13); men suffered more falls than women (19 vs. 13). The remaining injuries were due to motor vehicle accidents (13), assaults (11), and miscellaneous causes (14). Among the last were being hit by a flower pot falling from a window sill, a falling household ceiling, or a baseball bat. Other injuries included avulsion of fingers by a circular saw, those to a leg caught between an elevator and its shaft, a body burn from boiling water, and human and dog bites.

Most injuries were relatively minor: abrasions, contusions, lacerations and ankle sprains. Among those with minor injuries was a "fortunate" boy who fell through a first floor open window of an orphan asylum onto a well-kept lawn and sustained only an abrasion of the left eyebrow and superorbital region.

The more serious injuries were fractures. A total of 13 occurred, 8 of the upper and lower limbs, 4 of the skull, and 1 of the mandible. One boy had two fractures, of the skull and of the shoulder; and a 5-year-old boy sustained a skull fracture when he fell from the top of a slide in a playground onto concrete pavement.

Cases Related to Injuries

Falls: a woman caught in an elevator shaft The most extensive laceration I encountered during my ambulance service occurred in an office building where a 44-year-old woman had come to meet her lawyer. The woman reported that, as she was entering the elevator on the second floor, it dropped precipitously, then quickly reversed its direction and suddenly stopped at the second floor, trapping her left leg between the elevator and its shaft. The building superintendent had responded quickly to her screams and extracted her. He rested her on the hallway floor, made her as comfortable as possible, gave her some whiskey to relieve the stress, and summoned a physician who practiced in the building. The physician covered her wound with sterile gauze and left the scene, knowing that an ambulance had been called and would soon appear.

When I arrived, I found the woman in obvious pain, but well composed. I uncovered the wound and found a deep laceration, about 3 inches long, exposing torn muscles and surrounding fat. There were also abrasions and contusions on both legs and superficial lacerations of both calves and shins. I reapplied the

gauze. The patient was placed on a stretcher, her injured leg supported by a splint to prevent excessive motion. I greatly admired her absolute stoicism and lack of complaints in the face of severe pain as she was transported to the hospital.

Assaults: a man with a gunshot wound Late one morning, an ambulance call came from the Ninth Precinct on East 5th Street, where the police were holding a man with a gunshot wound. He had tried to pay off a long-standing gambling debt with three forged checks. His creditor had pursued and shot him, leaving him lying in the street, where the police picked him up.

On examining him, I found that, luckily, the bullet had followed a relatively benign course. It had entered at the left side of his chest between the second and third ribs, close to his left shoulder, and lodged beneath the skin over the back of his shoulder. Amazingly, it had missed his lung and the major blood vessels and nerves in the adjoining arm. He was not bleeding, there was no muscle weakness or neurological abnormality, and he had relatively little pain. Throughout my examination, he cried out, "I'd rather die than go to jail." Since there was no reason to recommend hospitalization, I had to leave him in police custody. Perhaps most amazingly, this was the only bullet wound I encountered in my month of ambulance service.

In the event of death from a gunshot wound, the physician who made the diagnosis had to notify the Medical Examiner's Office for removal of the body.

Inadequate explanation of injuries in young boys I saw a 4-year-old boy who was unconscious, had multiple abrasions and contusions of his head, a fractured skull, and a fracture and dislocation of his left shoulder. His mother reported that he had recently developed a "joyful" habit of jumping up and down on his bed and sometimes fell off and injured himself, but never seriously. She and her husband had failed to dissuade him from this practice, and so they had resorted to "smacking" him. He was admitted to Bellevue Hospital.

I also saw a 5-year-old boy who had contusions of the forehead and appeared dazed and confused, consistent with cerebral concussion and a probable fractured skull. His mother reported no change in his behavior pattern either at home or in school. She was at a loss to account for his condition. He, too, was admitted to Bellevue Hospital.

Each mother denied a serious fall or accident. Each said that she had called for an ambulance when she noticed a change in the mental status of her child. In retrospect, the failure of each mother to account for her child's changed mental state and injuries strongly suggested child abuse, a situation that had not at that time attained the recognition it has received in recent years.

Miscellaneous causes: a boy kicked by a horse A 4-year-old boy was seen at home. He had a contusion of the forehead, a bleeding fractured nose, and a sore back. He claimed that these injuries occurred when he fell to the ground after being kicked in the back by a horse attached to a parked peddler's wagon loaded with fruits and vegetables. An older boy had persuaded him to try to pluck some hairs from the horse's tail, for which his reward would be a peach pit ring. Children sometimes formed rings from peach pits, which they shaped by scraping both ends against a curbstone, leaving a hollowed-out ring in the center They then decorated the rings with horse hairs, which they wove around the ring, sometimes including a bit of colored glass as a "jewel." My young patient was gullible enough to undertake the risky effort. The horse no doubt was standing still when the boy crawled into the narrow space where the horse's tail was accessible. The horse then may have raised his hoof, frightening the boy, who fell face forward to the ground.

He picked himself up and climbed two flights of stairs to his mother while squeezing his nose to try to stop the blood flow. There were no kick marks or signs of trauma to his back. His mother chastised him for his daredevil behavior, while I applied manual pressure to stop the nosebleed, cleansed his forehead with tincture of green soap, and advised him to stay away from horses' tails.

Diseases of the Respiratory System

Diseases of the upper respiratory tract Of the 61 cases of respiratory disease, those of the upper respiratory tract far exceeded those of the lower respiratory tract (42 vs. 17). The predominant upper tract diseases were common cold (17), nasopharyngitis (11), and tonsillitis (9); sinusitis, croup, and peritonsillar abscess accounted for the remaining 5 cases.

Some of these patients had low-grade fever; the highest rectal temperature was 102.8°F. I prescribed bed rest, forced fluids, a light diet, saline gargle (1 teaspoon of salt in a glass of warm water every 4 hours), and 1 to 2 aspirin tablets, depending on age. Patients were advised to seek additional medical care if they did not begin to respond to the treatment in 1 or 2 days. Those who were afebrile were reassured that they had a mild illness and were advised to limit their activity if they felt the need.

Diseases of the lower respiratory tract The 17 cases of diseases of the lower respiratory tract were asthma (9), pneumonia (6), and influenza (2). Those with asthma had run out of medication; however, none was seriously ill. They responded to a subcutaneous injection of a 1:1,000 adrenaline solution and were given a sufficient supply of ephedrine sulfate capsules to last until they could replenish

the supply of their usual medication. I stayed with the patients until I felt confident they were responding to the treatment.

Five of the pneumonia patients had a history and physical findings consistent with pneumococcal pneumonia, and one had an exacerbation of suppurative pneumonia, a complication of a deformed chest and spine (kyphoscoliosis); all were admitted to Bellevue Hospital.

In retrospect, those suffering from pneumonia may have been, in a relative sense, fortunate. A preliminary report of ongoing studies at Bellevue Hospital of treatment of both typical and atypical pneumonia with sulfapyridine was most encouraging and seemed to point the way to a more effective treatment of the disease. "The mortality rate in this study in 157 cases was 9.5 percent," as compared with an expected rate of 25 to 35 percent, based on the first 88 cases.[14(p358)]

INFECTIOUS DISEASES

The contagious diseases of childhood accounted for all but 2 (tuberculosis and erysipelas) of the 45 cases of infectious disease. Measles (26) was by far the most frequent. Together, chicken pox, scarlet fever, mumps, and pertussis accounted for the remaining 17.

Children who had an uncomplicated contagious illness remained at home. The intern reported the condition of these patients by phone to the Health Department. The department decided whether quarantine was necessary. If so, a notice of the specific illness and duration of quarantine was pasted on the door leading to the home by visiting nurses, who also checked on the health status of the children during quarantine. Those too ill to be treated at home were transferred to the Willard Parker Hospital. Four of my measles patients were taken there.

A complicated case of measles A 3-year-old boy seen in early evening presented a life-threatening illness. His frantic young mother met me at the door and entreated me to save her only child, exclaiming: "My son has been having convulsions for the past few hours! He just had another." Her equally anxious young husband was hovering over the child, whose entire body was covered by small pinkish spots. His face was swollen, his eyes were tearing, and he had a nasal discharge and a rectal temperature of 105.6°F. He was breathing rapidly, making grunting sounds, and appeared moribund. This is all characteristic of a complicated full-blown case of measles.

I immediately instructed his mother to give him an alcohol sponge bath, sat him up to help him swallow water, and gave him an infant dose of aspirin and

a sedative preparation (sodium bromide and chloral hydrate). I then assisted his mother in giving him a soapsuds enema.

This was part of the routine treatment for high fever prescribed by Dr. Charles Hendee Smith, Director of Bellevue Hospital Pediatric Service and Professor at New York University School of Medicine. In fact, he was such a stickler for daily bowel movements for children that his injunction was "no stool, no school." Enemas were much relied on at this time. "Therapeutics—Care of Sick," a set of mimeographed clinical instructions issued by the medical school in 1937, included 10 different enemas, ranging from those for flatulence to those for malnutrition, including the introduction of beef juice.

I remained with the parents and child until his fever began to subside, and he appeared to be responding to treatment. Then, I arranged by telephone for his admission to Willard Parker Hospital.

Diseases of the Circulatory System

Heart disease The 17 cases of heart disease I attended were distributed among the following types: arteriosclerotic (8), hypertensive (7), and rheumatic (2). In the arteriosclerotic heart disease, angina was the most frequent complaint, occurring in 5 patients; congestive heart failure, myocardial infarction, and diabetes accounted for the other 3 cases.

Of the 7 hypertensive patients, 2 had congestive heart failure (1, described below, also had cardiac asthma), 2 had myocardial infarction, 1 had hemiplegia, 1 had hypertensive encephalopathy complicated by glomerulonephritis, and 1 had diabetes. Those with angina responded to nitroglycerin tablets placed under the tongue. Those with myocardial infarction, the two with congestive failure, and the one with hypertensive encephalopathy were admitted to Bellevue Hospital.

A case of cardiac asthma I saw an 87-year-old man at about 1:00 AM. His frail, elderly wife, anxious and distraught, met me at the door of their ground floor apartment. She reported that her husband had gone to bed at about 9:00 PM, and had suddenly awakened from sleep, coughing, short of breath, and making noises as he breathed.

I found a sickly looking elderly man sitting up in bed with his legs hanging down over the side, wheezing, mostly as he exhaled. His lungs were congested, his heart sounds were barely audible, his heart rate was rapid and totally irregular, and his feet and ankles were moderately swollen. Together, the history and physical findings were consistent with acute onset of cardiac asthma, a manifestation of congestive heart failure, with a predominance of failure of the blood-

pumping capacity of the left side of the heart accounting for the bronchial asthmalike breathing noises.

I administered morphine sulfate intravenously, followed by application of tourniquets serially to the upper and lower extremities for a few minutes with periods of release. The purpose of this treatment was to diminish the flow of blood returning to the heart, thus relieving the strain on the failing heart. (Oxygen then was unavailable in the ambulance.) In about half an hour, the patient obtained some relief and said he felt better. He was admitted to Bellevue Hospital.

His wife told me how grateful she was for her husband's improvement. She wondered why I did not remove him to the hospital immediately. I explained that he was too sick when I first examined him, and that the stress of being moved then would have been too great a risk.

In retrospect, had I informed her of my choice of treatment at the start, I may have allayed her anxiety somewhat; however, time was of the essence.

The immediate beneficial outcome, based on the application at the bedside of simple, basic physiologic principles, gave me great pleasure.

Diseases of the Digestive Tract

Gallbladder disease The 22 patients with diseases of the digestive tract exhibited two striking findings: dominance of women (17) versus men (5) and the incidence of gall bladder disease among the women. Of them, 9 had either acute cholecystitis or exacerbation of chronic cholecystitis, with or without cholelithiasis. In contrast, none of the men had symptoms or signs of gall bladder disease.

I administered atropine sulfate to the 9 with gall bladder disease, 6 of whom had a good response. All 9 were advised to arrange to attend the Bellevue Hospital Gastrointestinal Clinic.[15]

Disorders of the Digestive Tract

The role of infection The mother of a 3-month-old reported that he had been vomiting and having diarrhea for the past 3 days. These disturbances began a few days after he appeared to have recovered from a low-grade cold, which had only a minor effect on his appetite and did not change his cheerful disposition.

On physical examination, the infant was afebrile, his lungs were clear; the only abnormalities were his apparent dehydration and restlessness. I explained to the mother that, as a result of her child's persistent vomiting and diarrhea, he had become dehydrated. To neglect this condition would be highly risky, and therefore it was best that he be hospitalized promptly. She agreed and rode along with me in the ambulance, hugging the baby, to Bellevue Hospital.

A PRACTICAL ASPECT OF MY AMBULANCE NOTES

In May 1939, 1 year following my ambulance duty (I was then a senior house officer in medicine at Bellevue Hospital), I received a phone call from a member of the legal staff of the Ambulance Division of the Department of Hospitals. He said that a woman was suing the city because of a disabling back problem caused by a fall in the subway. He asked if I recalled such a case since I was listed as having seen the patient during my ambulance service. I responded that I did not, but that I had kept a record of the cases that I had seen and would check my entry for the name and date. I promised to return his call the next day.

My records revealed the following: late on May 1, 1938, my first day of ambulance duty, I attended a 44-year-old woman, with the name he had given me, on the downtown side of the Third Avenue line's 42nd Street elevated station. (Elevated trains were still in service at that time.) She complained of a painful left ankle and shin. She reported that, as she was descending the stairs, she was "pushed" by the crowd and fell down the entire flight of stairs. She was taken to the station restroom by a man, who left when the station master came to her aid. The station master stated that there were only eight steps in that particular segment of stairway. The patient could not recall other details of the accident or how she came to the restroom. She had not struck her head on the ground or the stairs, nor did she complain of head or neck pain.

She was in pain, but composed, while walking to an adjacent room provided by the station master so that I could examine her in privacy. I had her lower her skirt and raise her blouse and found no external sign of trauma and no pain or tenderness over the skull, spine, or pelvis. There were superficial abrasions over the left shin and a left ankle sprain. I strapped the ankle in eversion (turned outward), supporting the inner aspect. She reported that this gave her much pain relief. I cleansed the abrasions with tincture of green soap, applied mercurochrome, and advised her to see her local physician for follow-up.

The lawyer was grateful for my thoroughness and, in response to my question whether I would have to testify in court, assured me that my report would rule out any basis for a lawsuit against the city.

REFLECTIONS ON MY AMBULANCE DUTY

I had the good fortune of entering medicine in the late 1930s. It was a significant time of demarcation, during which medicine moved further into the realm of science and away from a period of greater reliance on the art of medicine practiced by most physicians. In fact, 1938 marked a period of intense investigation at Bellevue and other hospitals that ultimately established the antimicrobial efficacy

of sulfapyridine, a member of the then recently discovered sulfanilamide class of chemotherapeutic agents.

This development had a dramatic effect on the prevention and treatment of heretofore highly fatal infectious diseases. For the first time in the history of medicine, potent agents of known chemical composition became available to treat bacterial infection, such as childbirth fever, erysipelas, pneumococcal pneumonia, and meningococcal meningitis, to cite a few.

The most striking example of this occurred among pediatric cases. A comparison of the cases that I saw in 1938 with a similar set 50 years later sheds light on this. Pediatric cases accounted for 27% of the 384 total cases that I saw in 1938. Of these 100 cases, 43 were for infectious disease, and 24 were for diseases of the respiratory tract. Together, then, these accounted for 67% of the total pediatric cases.

In 1988, based on a review of a comparable number of cases in the same month of May, pediatric cases accounted for only 6% of the total 388 cases. Furthermore, there were no pediatric infectious disease cases, and pediatric respiratory tract cases accounted for only 2% of the pediatric cases. Together, then, these accounted for 2% of the total pediatric cases. This is a dramatic illustration of the ways changes in treatment initiated in 1938 have played themselves out in modern medicine.

As to my personal reactions, my month-long ambulance duty was exciting and often challenging. At the beginning, I was somewhat apprehensive because, for the first time in my hospital training, I alone was responsible for making what might be critical health-related decisions.

However, my self-confidence quickly blossomed when, during my very first day, I made 19 calls. These included those for contagious diseases of childhood, heroin addiction and acute alcoholism, a human bite of the hand, arteriosclerotic heart disease and angina, psychiatric disorders, digestive disorders in infants and adults, gall bladder disease, upper respiratory infection, osteoarthritis of the lumbar spine, the woman whose leg was caught in an elevator shaft, the woman who was "pushed" down subway stairs, and one who fell in a movie house stairway.

In some house calls, I gained insight into the impact of household environment and interactions of family members on a patient's condition, aspects of the doctor-patient relationship unobtainable in the hospital. This helped me to empathize with patients and to allay the fears of anxious parents, particularly when I decided that hospitalization was necessary. It also facilitated explaining and dictating the treatment prescribed for those patients who remained at home.

I derived considerable satisfaction from having recognized clinical disorders that responded to simple physiologic principles, such as the treatment of hyperventilation tetany by having the patient rebreathe air previously exhaled into a paper bag and the bloodless phlebotomy to treat cardiac asthma.

A major deficiency and frustrating aspect of my ambulance assignment as a learning experience was not having the time to follow the patient's hospital course. I would have liked to compare my diagnosis with that of the hospital staff. Institutionally, this deficit might have been corrected by arranging the ambulance schedule to allow a half-day off each week for ambulance interns to visit the patients they had admitted. All participants in the emergency care system might have benefited from such an arrangement.

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